

What is claimed is:

1. A system for controlling a process involving a specimen, the system comprising:
 - 5 a first electrode covered by a cover layer of insulating material and adapted to receive a modulated electrical voltage for generating an electric field in the specimen;
 - a measuring circuit for measuring at least one pa-
10 rameter depending on a response of the specimen to the field;
 - a data processor section connected to the measuring circuit and operative to determine a concentration of a substance in the specimen from the parameter and to out-
15 put data in response to the determined concentration; and
 - a control circuit connected to the data processor section and operative to receive data from the data processor section and to control an aspect of the process based at least in part on the data from the data proces-
20 sor.
2. The system of claim 1 wherein the control means comprises:
 - a valve control adapted for controlling a valve
25 based at least in part on the concentration data.
3. The system of claim 1 wherein the data from the data processor section is concentration data.
- 30 4. The system of claim 1 wherein the system further comprises:

an electrically insulating substrate, wherein the first electrode is arranged on a first side of the substrate between the substrate and the cover layer.

5. The system of claim 4 further comprising a second electrode arranged on the substrate, and wherein the first and second electrodes are adapted to generate a modulated field between the electrodes in response to the modulated electric voltage..
6. The system of claim 5, wherein the second electrode comprises a bottom electrode layer arranged on a second side of the substrate, the bottom electrode layer having a larger extension than the first electrode.
7. The system of claim 6 wherein the second electrode comprises a top electrode layer arranged on the first side of the substrate, the top electrode layer being arranged around at least part of the first electrode.
8. The system of claim 7 wherein the system further comprises:
first and second signal paths between the signal source and the measuring circuit, wherein the first electrode is arranged in the first signal path and a reference load is arranged in the second signal path, and wherein the measuring circuit is adapted to measure at least one of a relative amplitude (A) and a phase (ϕ) of signals from the first and second paths.
9. The system of claim 8 wherein the first electrode is part of a capacitor of a resonant circuit comprising

the capacitor and an inductance, the resonant circuit being connected to the signal source.

10. The system of claim 9 wherein the capacitor and the inductance are arranged in series.

5 11. The system of claim 9 wherein the system further comprises an antenna electrode arranged in proximity to the first electrode and wherein the measuring circuit is adapted to measure a signal transmitted from the first electrode to the antenna electrode.

10 12. A method for managing a process involving a specimen, the method comprising:

arranging a first electrode at the specimen, wherein the first electrode is electrically insulated from the specimen;

15 receiving a modulated electrical voltage signal at the first electrode to generate a modulated field in the specimen;

measuring at least one parameter depending on a response of the specimen to the field;

20 determining a concentration of a substance in the specimen based at least in part on the measured parameter; and

controlling an aspect of the process based at least in part on the determined concentration.

25 13. The method of claim 12 wherein controlling an aspect of the process comprises controlling a valve based at least in part on the determined concentration.

14. The method of claim 12 wherein the method further comprises arranging a second electrode at the specimen and wherein the modulated electrical voltage generates a modulated field between the first and the second electrode.
15. The method of claim 14 wherein the second electrode is in electric contact with the specimen.
16. The method of claim 14 wherein the method further comprises measuring a temperature of the specimen and using the temperature in the determination of the concentration.
17. The method of claim 12 wherein the modulated electrical voltage signal is a sine wave.
18. The method of claim 17 wherein the modulated electrical voltage signal has a frequency between 10 MHz and 2 GHz.
19. The method of claim 12 wherein the method further comprises arranging an antenna electrode at the specimen in proximity to the first electrode and wherein the response of the specimen is measured by measuring a signal transmitted from the first electrode to the antenna electrode.
20. The method of claim 12 wherein the substance is glucose.
21. The method of claim 12 wherein the specimen is a living body.
22. The method of claim 12 wherein the determining the concentration comprises using calibration data to convert the parameter to the concentration.

23. The method of claim 12 wherein the first electrode forms part of a resonant circuit having a resonance frequency and wherein the resonant circuit is operated substantially at the resonance frequency.
- 5 24. The method of claim 23 wherein the resonant circuit is at least part of a tank circuit of an active oscillator and wherein the parameter is one of an amplitude and a frequency of a signal generated by the oscillator.
- 10 25. The method of claim 12 wherein receiving a modulated voltage comprises receiving a frequency swept modulated voltage wherein the frequency is swept from a frequency below the resonance frequency to a frequency above the resonance frequency.
- 15 26. The method of claim 12 wherein the substance is an alcohol.
27. The method of claim 12 wherein the specimen is a
20 salt solution.
28. The method of claim 12 wherein the substance is a salt.
- 25 29. A method for obtaining an indication of a condition of a specimen, the method comprising:
- arranging a first electrode at the specimen, wherein the first electrode is electrically insulated from the specimen;

receiving a modulated electrical voltage signal at
the first electrode to generate a modulated field in the
specimen;

measuring at least one parameter depending on a re-
5 sponse of the specimen to the field;

determining an impedance of the specimen based at
least in part on the measured parameter; and

determining whether an indication of a condition ex-
ists based at least in part on the impedance of the
10 specimen.

30. The method of claim 29 wherein the determining
whether an indication of a condition exists comprises us-
ing calibration data.

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31. The method of claim 29 wherein the condition is
edema.